

AD-A140 358

HELICOPTER PILOT/COPILOT SURVIVAL SYSTEM(U) NAVAL AIR
DEVELOPMENT CENTER WARMINSTER PA AIRCRAFT AND CREW
SYSTEMS TECHNOLOGY DIRECTORATE G P GILLESPIE JUN 83
NADC-83098-60 F/G 6/7

1/1

UNCLASSIFIED

NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

12

REPORT NO. NADC-83098-60



ADA140358

HELICOPTER PILOT/COPILOT SURVIVAL SYSTEM

George P. Gillespie
Aircraft and Crew Systems Technology Directorate
NAVAL AIR DEVELOPMENT CENTER
Warminster, Pennsylvania 18974

JUNE 1983

PHASE REPORT

Approved for Public Release; Distribution Unlimited

Prepared For
NAVAL AIR SYSTEMS COMMAND
Department of the Navy
Washington DC 20361

DTIC
ELECTE
APR 24 1984
A

DTIC FILE COPY

84 04 23 038

NOTICES

REPORT NUMBERING SYSTEM — The numbering of technical project reports issued by the Naval Air Development Center is arranged for specific identification purposes. Each number consists of the Center acronym, the calendar year in which the number was assigned, the sequence number of the report within the specific calendar year, and the official 2-digit correspondence code of the Command Office or the Functional Directorate responsible for the report. For example: Report No. NADC-78015-20 indicates the fifteenth Center report for the year 1978, and prepared by the Systems Directorate. The numerical codes are as follows:

CODE	OFFICE OR DIRECTORATE
00	Commander, Naval Air Development Center
01	Technical Director, Naval Air Development Center
02	Comptroller
10	Directorate Command Projects
20	Systems Directorate
30	Sensors & Avionics Technology Directorate
40	Communication & Navigation Technology Directorate
50	Software Computer Directorate
60	Aircraft & Crew Systems Technology Directorate
70	Planning Assessment Resources
80	Engineering Support Group

PRODUCT ENDORSEMENT — The discussion or instructions concerning commercial products herein do not constitute an endorsement by the Government nor do they convey or imply the license or right to use such products.

APPROVED BY: 

T. J. GALLAGHER
CAPT, MSC, USN

DATE: 4 April 1984

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NADC-83098-60	2. GOVT ACCESSION NO. A140358	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Helicopter Pilot/Copilot Survival System Phase Report		5. TYPE OF REPORT & PERIOD COVERED Phase, from concept to June 1983
7. AUTHOR(s) George P. Gillespie, Code 60336		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS Aircraft and Crew Systems Technology Directorate Naval Air Development Center, Warminster, PA 18974		8. CONTRACT OR GRANT NUMBER(s)
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Air Systems Command Department of the Navy Washington, DC 20360		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		12. REPORT DATE June 1983
		13. NUMBER OF PAGES
		15. SECURITY CLASS. (of this report) Unclassified
		16. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for Public Release; Distribution Unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Helicopter, Pilot/Copilot, Survival System, Survival Vest		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The system described in this report is designed to provide the necessary survival capabilities to cover a wide range of emergencies when escaping from a downed helicopter. It is designed to provide armor protection, flotation capability, lift capability and use of survival items.		

TABLE OF CONTENTS

	Page
INTRODUCTION	1
PURPOSE	1
SYSTEM DESCRIPTION	1
. Front and Rear Armor	1
. Mini-Raft	2
. LPU-21B/P Life Preserver	2
. Survival Items	2
. Snap Link Hoist Ring	2
CONCLUSIONS	2

LIST OF FIGURES

Figure	Title	Page
1	Front View of Vest	3
2	Rear View of Vest	4



Accession For	
NTIS GRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Date	
Auth	
vail	
Secret	
A1	

INTRODUCTION

The Naval Air Development Center has developed three mission specific survival systems for Naval helicopter aircrewmembers. These systems are categorized for use as: The stationary aircrewman, the mobile aircrewman and the passenger. The systems are designed to meet the diverse requirements of the aircrew, be fully compatible with in-flight duties and provide the equipment necessary to aid in survival and detection.

The Helicopter Pilot/Copilot Survival System described in this report is designed for pilots, copilots and other aircrewmembers who perform similar functions as stationary aircrewmembers. They require a survival system designed to provide the necessary survival capabilities to cover a wide range of emergencies when escaping from a downed helicopter. The Helicopter Pilot/Copilot Survival System, ~~in accordance with the above requirement~~, was designed to be worn constantly during missions over land or water; and to provide armor protection, flotation capability, lift compatibility, and use of survival items. The system and its subsystems are compatible with current aircrew requirements and do not interfere with the standard duties of the wearer.

Between 1973 and 1975 several experimental models of this system were fabricated for the Naval Air Development Center (NADC). They were subjected to NADC's pool tests, static life tests, and a few life tests. Based on shortcomings uncovered by these tests, several new prototypes were fabricated and subjected to a series of tests between 1976 and 1977. The tests proved the validity of the new design.

PURPOSE

The purpose of this report is to document the development to-date, of this Helicopter Pilot/Copilot Survival System. Due to this system's present unfunded status, development has been curtailed. Upon resumption of development, this report will be utilized to assist those involved in future development of this system.

SYSTEM DESCRIPTION

The system consists of a vest-like garment made of Aramid cloth, developed to contain front and rear armor, a Mini-Raft, an LPU-21B/P Life Preserver and Survival Items. In addition, the vest contains a snap link hoist ring to provide lift capability to the wearer, from land or water; and to accommodate the above survival subsystems. The system is designed for the wearer's comfort, freedom of movement and ease of adjustment. Figure 1 is a front view drawing of the vest and Figure 2 is a picture of the rear view. Descriptions of the subsystems contained in this vest, are as follows:

.Front and Rear Armor. To ensure that the system would be compatible with the body armor, the front and rear armor plates were positioned ideally on the body and the system was built around it. The Navy will use the new, light weight, contoured plates being designed by the U.S. Army Research and Development Command, Natick, MA. The front armor plate is secured to the vest by double slide fastener,

protecting the user's frontal area; and the rear plate is held in the vest's rear pocket to protect the user's back. Both armor plates are optional.

•Mini-Raft. The Mini-Raft is a one man Life Raft fabricated from heat sealable polyurethane coated cloth composed of two inflatable cells. Its main or primary buoyancy is obtained by inflating the CO₂ Inflation Chamber by means of a 56 gram CO₂ bottle using a standard inflation assembly. Inflation of the raft is performed by pulling the inflation lanyard shown in Figure 1; and as the Mini-Raft expands, it opens a hook and pile closure allowing the Mini-Raft to deploy and the rear armor to fall away. Secondary buoyancy can be added by orally inflating the oral inflation chamber. The Mini-Raft is stowed in the vest's rear pocket and is tethered to the user's vest to avoid loss in water, when deployed.

•LPU-21B/P Life Preserver. The LPU-21B/P Life Preserver was selected because it can easily support the survivor with his armor in the water. It is attached to the vest and is inflated by manually activating two CO₂ cells with the beaded handle. The preserver is also highly compatible with the fixed crew stations of the pilot, copilot, or other aircrewmembers.

•Survival Items. Survival Items consist of 1 Dye Marker, 1 Strobe Light, 1 Steady Burn Light, 2 MK-13 MOD 0 Day/Night Flares, 1 Small Signal Mirror, 1 Penguin Flare, 1 Whistle, 1 Four Ounce Water Bottle, 1 PRC-90 Radio, and 1 utility Knife. They are located in pockets on the frontal areas of the vest, within easy reach of the wearer.

•Snap Link Hoist Ring. The Snap Link Hoist Ring is securely sewn to the front of the vest, capable of supporting a 200 pound person while withstanding a 3G upward pull from a helicopter.

The vest serves as a platform for the various subsystems and determines the comfort properties. After the vest is donned, proper fit can be easily made by adjusting the side straps. This can be accomplished rapidly with one hand. This easy fitting feature provides improved comfort during operations and emergency lift. It also helps keep the armor secure to the body for proper protection and easier movement. Since the vest is open sided except for the adjusting straps, heat dissipation is enhanced. The Helicopter Pilot/Copilot Survival System is suitable for summer and winter wear.

SYSTEM CHARACTERISTICS

<u>Characteristic</u>	<u>Threshold</u>	<u>Goal</u>
Weight	Maximum system weight shall be less than 35 pounds.	30 pounds
Buoyancy	The inflated LPU-21B/P shall support a 200 pound person in full gear.	Same

<u>Characteristic</u>	<u>Threshold</u>	<u>Goal</u>
Hoisting Capability	This system's hoisting apparatus shall be capable of supporting a 200 pound person in full gear while withstanding a 3G upward pull from a helicopter.	Same
Deployment of the	30 seconds after CO ₂ cell activation	20 seconds
Armor Plate Jettisoning	Back plate automatically jettisoned 10 seconds after activation of Mini-Raft CO ₂ cell; front plate manually jettisoned in 10 seconds.	Back plate in 4 seconds; front plate in 4 seconds
System easily donned/doffed	Donned in 30 seconds, doffed in 15 seconds	Donned in 10 seconds, doffed in 5 seconds
Adjustable for size	5th to 95th size percentile	Same
Body heat dissipation in Helicopter ambient of 90° - 100° F	Heat dissipation judged adequate by wearers	Same
Removal of back and front armor plates upon entering water	After entering water, back plate falls away by deployment of Mini-Raft within 10 seconds; Front Plate, 5 seconds manual removal time	Back plate, 4 seconds; Front plate, 4 seconds removal time
Inflation of Life Preserver to design shape	30 seconds after activation of CO ₂ cells	8 seconds
Autorotation of unconscious survival by Life Preserver	5 seconds	1 second
Boarding of Mini-Raft with Life Preserver inflated	20 seconds	Same
Compatible for use in following aircraft	UH-1, AH-1, H-2, H-3, H-46, H-53, H-60	Same

CONCLUSIONS

The information documented in this report should be of assistance to those continuing with this system's development, and to those involved in related systems' developments.

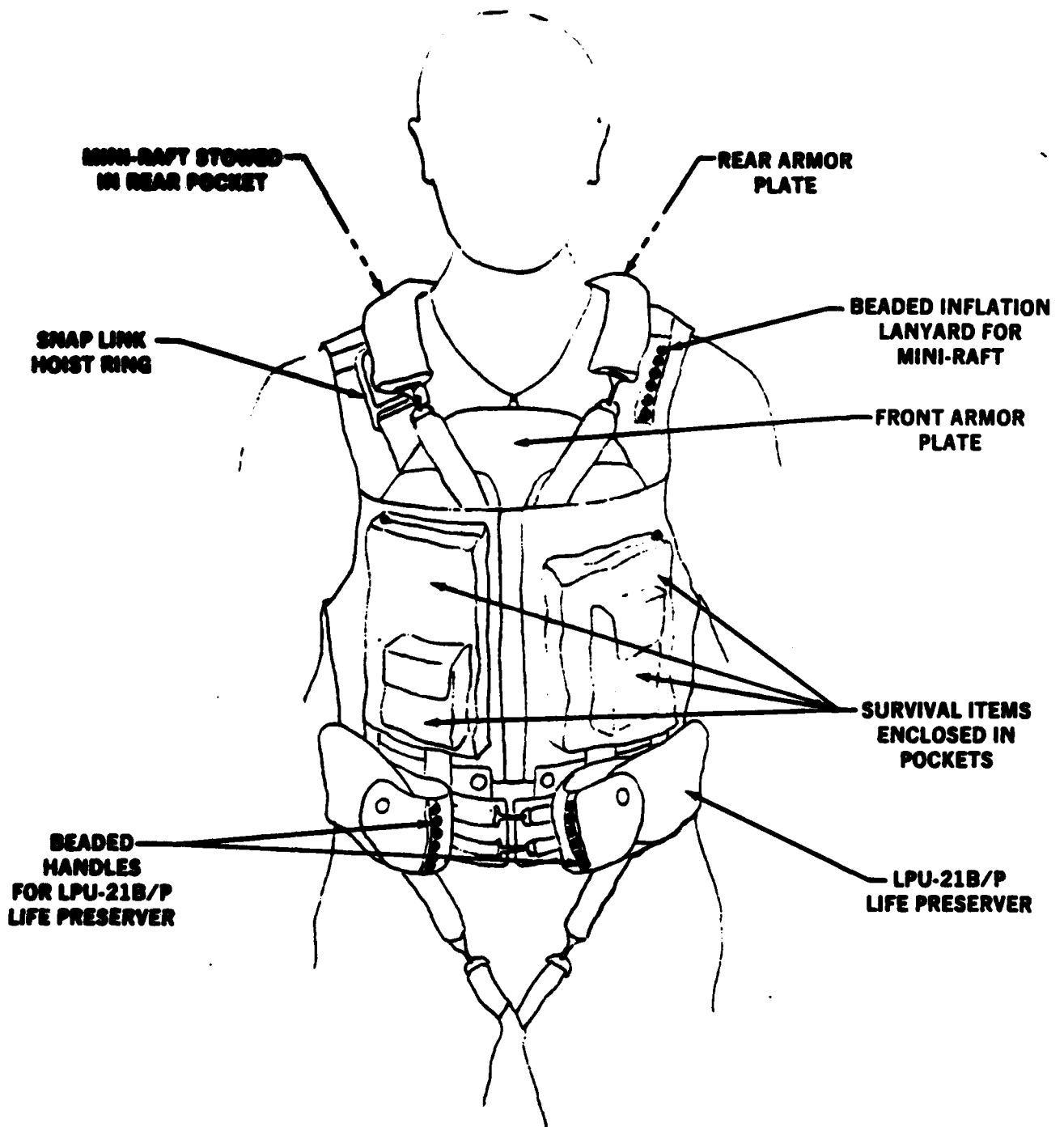


FIGURE 1. FRONT VIEW OF VEST

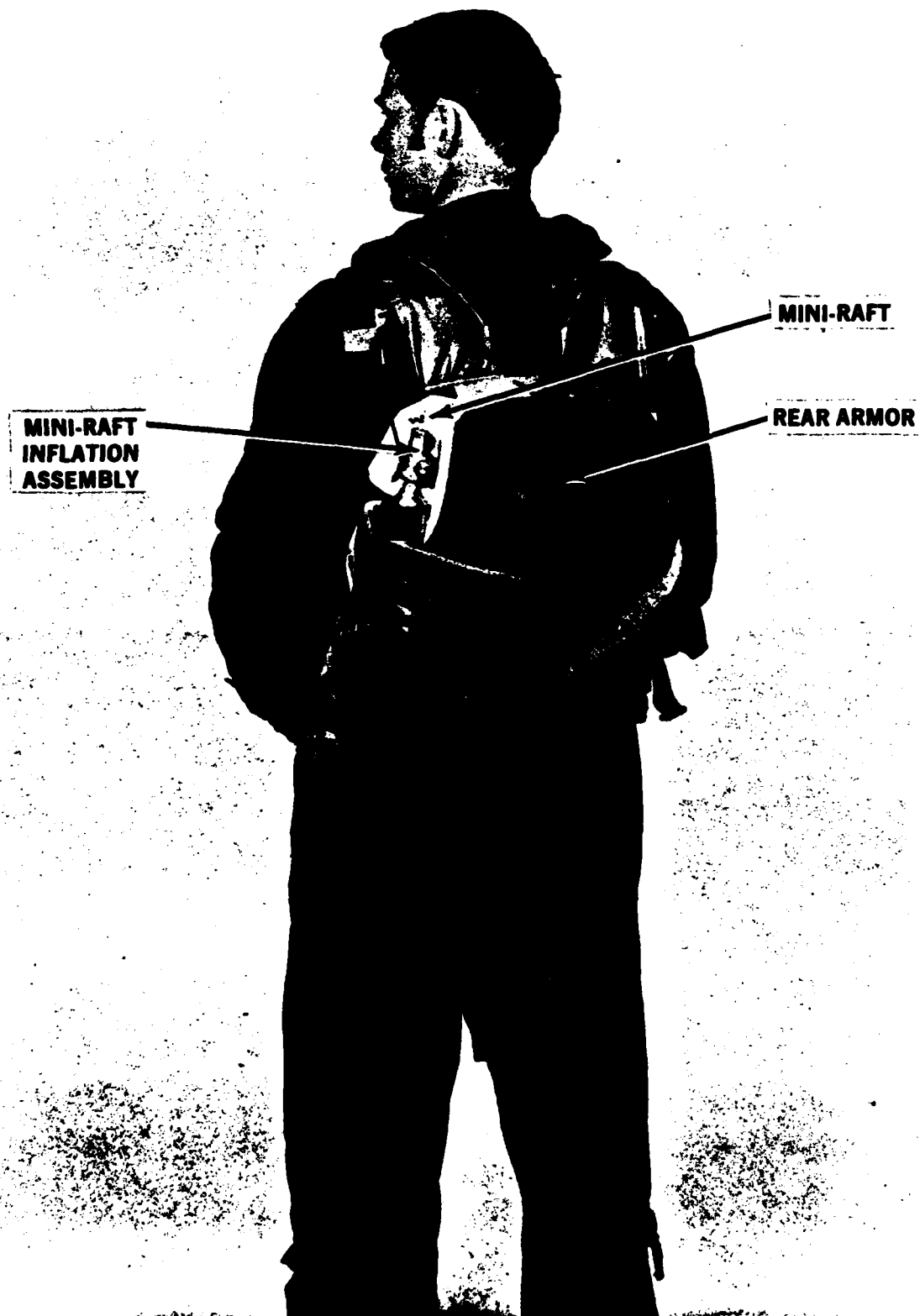


FIGURE 2. REAR VIEW OF VEST

END

FILMED

5-84

DTIC